

REMARKS

By this Amendment, claims 1-5, 7, 12-15, 17, 22, 24-26, 28, and 30 have been canceled without prejudice or disclaimer, claims 6, 16, and 23 have been amended, and new claims 31-35 have been added. Consequently, claims 6, 8-11, 16, 18-21, 23, 27, 29, and 31-35 are pending in this application, with claims 6, 16, and 23 being independent.

For the following reasons, Applicants respectfully request reconsideration and withdrawal of all outstanding rejections in the final Office Action dated April 6, 2004.

35 U.S.C. § 112, Second Paragraph, Rejection

In the final Office Action, claims 13, 14, and 30 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. In addition to the Examiner's indication in the Advisory Action dated August 16, 2004 (i.e., that the Applicants' August 6, 2004 Amendment has overcome this rejection), Applicants respectfully submit that this rejection is rendered moot by cancellation of claims 13, 14, and 30. Thus, Applicants respectfully request reconsideration and withdrawal of this rejection.

35 U.S.C. § 102 Rejection Based on Sagusa et al.

Claim 1 was rejected under 35 U.S.C. § 102(b) as being anticipated by Sagusa et al. (Japanese Patent Application Publication No. 09-165681), according to the rationale discussed in paragraph 5 of the final Office Action. Applicants respectfully submit that this rejection has been rendered moot by cancellation of claim 1. Thus, reconsideration and withdrawal of this rejection is respectfully requested.

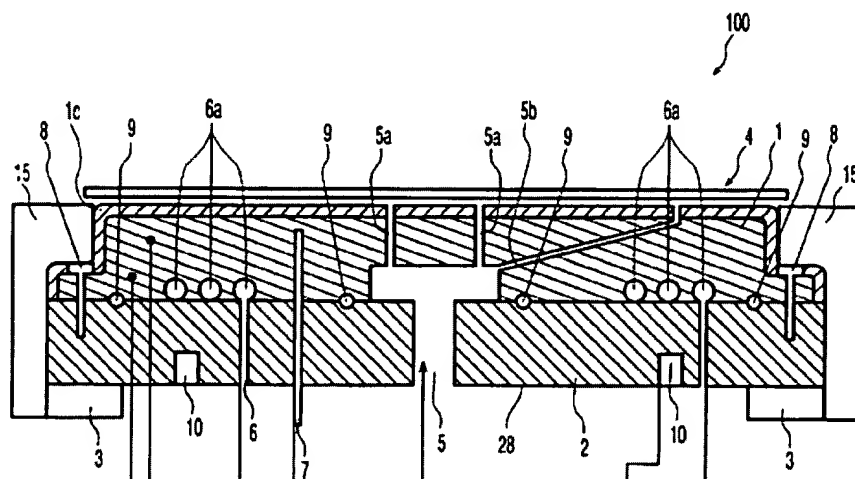
35 U.S.C. § 103 Rejection Based on McMillin et al.

Claims 6, 8-11, 16, 19-21, 27, and 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McMillin et al. (U.S. Patent No. 5,835,334), according to the rationale in paragraphs 7 and 10 of the final Office Action. Applicants respectfully traverse this rejection and request reconsideration and withdrawal of this rejection.

Independent claim 6 recites a susceptor including, among other things, “a base metal made of a cast metal,” “a heater arranged on a plane,” “an upper ceramic-metal composite arranged above the heater,” and “a ceramic electrostatic chuck having an upper surface and a lower surface opposite the upper surface, the upper surface being adapted to support an object to be processed thereon.” The upper ceramic-metal composite has an upper surface joined to the lower surface of the electrostatic chuck, and the heater and the upper ceramic-metal composite are cast in the base metal so that the upper ceramic-metal composite and the heater are embedded in the base metal while leaving the upper surface of the upper ceramic-metal composite exposed for joining to the lower surface of the electrostatic chuck. The upper ceramic-metal composite contains a ceramic material and a metallic material consisting of the base metal, and a mixing ratio between the ceramic material and the metallic material is determined so that the upper ceramic-metal composite has a coefficient of linear thermal expansion substantially the same as that of the electrostatic chuck.

Independent claim 16 recites a plasma processing apparatus including, among other things, a susceptor arranged in a processing vessel and having a similar structural configuration as that of independent claim 6. As detailed below, independent claims 6 and 16 define novel and non-obvious subject matter over McMillin et al.

McMillin et al. discloses an electrostatic chuck 100 having an electrode cap 1 and a lower electrode 2. As shown in the figure¹ below, the top surface of the lower electrode 2 is in contact with the bottom surface of the electrode cap 1. On the top surface of the electrode cap 1, a dielectric layer 1c (i.e., an anodization coating) is provided.



In the final Office Action, the Examiner asserted that the electrode cap 1 corresponds to the recited ceramic electrostatic chuck and that the dielectric layer 1c corresponds to the recited upper ceramic-metal composite. See paragraph 7, subparagraphs ii and iv, of the final Office Action. Therefore, according to the Examiner's interpretation, McMillin et al. teaches that the lower surface of the upper ceramic-metal composite 1c is in contact with the upper surface of the electrostatic chuck 1. This configuration, however, is completely opposite to the susceptor configuration recited in each of claims 6 and 16 because the claims each recite that, among other things, the upper surface of the upper ceramic-metal composite is joined to

¹ The figure is an upper portion of Fig. 1 of McMillin et al., showing the configuration of an electrostatic chuck.

the lower surface of the electrostatic chuck. That is, claims 6 and 16 each recites a configuration in which an electrostatic chuck is positioned above an ceramic-metal composite, while McMillin et al. teaches an opposite configuration in which an electrostatic chuck is positioned below a ceramic-metal composite. Therefore, McMillin et al. does not disclose, among other things, “the upper ceramic-metal composite [having] an upper surface joined to the lower surface of the electrostatic chuck,” as recited in each of claims 6 and 16.

Moreover, since the electrode cap 1 is completely covered by the dielectric layer 1c, the upper surface of the electrode cap 1 cannot be “adapted to support an object to be processed thereon,” as recited in claims 6 and 16.

In addition, McMillin et al. or any other cited reference does not teach, or otherwise suggest, among other things, “the upper ceramic-metal composite [containing] a ceramic material and a metallic material consisting of the base metal, and a mixing ratio between the ceramic material and the metallic material [being] determined so that the upper ceramic-metal composite has a coefficient of linear thermal expansion substantially the same as that of the electrostatic chuck,” as recited in claims 6 and 16.

For example, the dielectric layer 1c (i.e., asserted by the Examiner as corresponding to the recited upper ceramic-metal composite) does not contain a ceramic material and a metallic material consisting of the base metal, where the ceramic and metallic materials are mixed with the claimed mixing ratio. Instead, the dielectric layer 1c is coated onto the top surface of the electrode cap 1.

For at least the reasons set forth above, independent claims 6 and 16, and their respective dependent claims, define novel and non-obvious subject matter over McMillin

et al. Thus, Applicants respectfully request reconsideration and withdrawal of these rejections.

35 U.S.C. § 103 Rejections Warmough and Sagusa et al.

Claims 22 and 23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Warmough (U.S. Patent No. 4,404,262) in view of Sagusa et al., according to the rationale discussed in paragraph 12 of the Office Action. Claim 22 has been cancelled and, therefore, the rejection of claim 22 has been rendered moot. For the following reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 23.

Independent claim 23 recites a method of making a susceptor including “placing a heater and a first porous ceramic block in a mold,” “pouring a molten base metal into the mold to cast the porous ceramic block and the heater in the base metal, thereby infiltrating the porous ceramic block with the base metal in order to form a ceramic-metal composite,” and “joining a ceramic electrostatic chuck onto a surface of the ceramic-metal composite,” “wherein a porosity of the porous ceramic block is determined so that the ceramic-metal composite has a coefficient of linear thermal expansion substantially the same as that of the electrostatic chuck.”

The cited references, either taken alone or in combination, do not teach or suggest each and every recitation of independent claim 23. For example, none of the cited references teaches, or otherwise suggests, among other things, method steps of placing a heater and a first porous ceramic block in a mold, and pouring a molten base metal into the mold to cast the porous ceramic block and the heater in the base metal,

thereby infiltrating the porous ceramic block with the base metal in order to form a ceramic-metal composite.

Furthermore, none of the cited references teaches or discloses that, among other things, a porosity of the porous ceramic block is determined so that the ceramic-metal composite has a coefficient of linear thermal expansion substantially the same as that of the electrostatic chuck.

For at least the reasons set forth above, independent claim 23 defines novel and non-obvious subject matter over the cited references. Thus, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 103 Rejections McMillin et al. and Fukasawa et al.

Claim 18 was rejected under 35 U.S.C. § 103(a) as being unpatentable over McMillin et al. in view of Fukasawa et al. (U.S. Patent No. 5,310,453).

Dependent claim 18 depends from independent claim 16. As discussed above, independent claim 16 are patentably distinguishable over McMillin et al. Moreover, Fukasawa et al. does not cure the deficiencies of McMillin et al. Consequently, dependent claim 18 should also be allowable at least by virtue of its dependency from allowable independent claim 16. Thus, reconsideration and withdrawal of this rejection is respectfully requested.

Other Remaining Rejections Under 35 U.S.C. § 103

Claims 2-5, 7, 12-15, 17, 24-26, 28, and 30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over different combinations of McMillin et al., Sagusa et al., Shackelford (Introductions to Materials Science for Engineers), and Wang et al. (U.S. Patent No. 5,755,886). Applicants respectfully submit that these rejections are

rendered moot by cancellation of all the rejected claims. Thus, reconsideration and withdrawal of these rejections is respectfully requested.

Conclusion

Applicants respectfully request the reconsideration of this application, the withdrawal of all the outstanding rejections, and the allowance of all pending claims.

The final Office Action and the Advisory contain a number of statements and characterizations regarding the claims and the related art. Applicants decline to subscribe automatically to any statement or characterization in the final Office Action and the Advisory Action, regardless of whether it is addressed above.


The Examiner is invited to call the undersigned (571-203-2735) if a telephone conversation might advance prosecution of the application.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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